#define BLYNK\_TEMPLATE\_ID "TMPL6R3sD\_hHX"

#define BLYNK\_TEMPLATE\_NAME "SMART PLANT WATERING SYSTEM"

#define BLYNK\_AUTH\_TOKEN "14\_S6EnI5sOjbUxS9ZFGALuTYyGe2izM"

// LIBRARIES

#include <WiFi.h>

#include <WiFiClient.h>

#include <BlynkSimpleEsp32.h>

#include <DHT.h>

// --- Pin Definitions ---

#define DHTPIN 14

#define DHTTYPE DHT11

#define SOIL\_PIN 34

// The RELAY\_PIN is now on the Arduino, not here.

// --- WiFi Credentials ---

char ssid[] = "SM-POKHARA1";

char pass[] = "6557165571";

// --- Sensor & Timer Setup ---

DHT dht(DHTPIN, DHTTYPE);

BlynkTimer timer;

// --- State Variables ---

int mode = 0;           // 0 = Auto, 1 = Manual

int manualPump = 0;     // 1 = ON, 0 = OFF

bool isSoilDry = false;

bool pumpOn = false;

// --- Virtual Pins ---

#define PUMP\_LED\_VPIN V5

// --- Mode Switch (Auto / Manual) ---

BLYNK\_WRITE(V4) {

  mode = param.asInt();

}

// --- Manual Pump Button ---

BLYNK\_WRITE(V3) {

  manualPump = param.asInt();

}

void sendDataAndControlPump() {

  // --- Read Sensors ---

  float temp = dht.readTemperature();

  float hum = dht.readHumidity();

  int soilRaw = analogRead(SOIL\_PIN);

  int soilPercent = map(soilRaw, 4095, 1700, 0, 100); // Using a generic but reasonable calibration

  soilPercent = constrain(soilPercent, 0, 100);

  // --- Send to Blynk ---

  Blynk.virtualWrite(V0, temp);

  Blynk.virtualWrite(V1, hum);

  Blynk.virtualWrite(V2, soilPercent);

  // --- Decide Pump State ---

  bool pumpShouldBeOn;

  if (mode == 0) { // Auto Mode

    pumpShouldBeOn = (soilPercent < 30); // Turn on if moisture is less than 30%

  } else { // Manual Mode

    pumpShouldBeOn = (manualPump == 1);

  }

  // --- SEND COMMAND TO ARDUINO ---

  // This is the key change. Instead of digitalWrite, we send a character.

  if (pumpShouldBeOn) {

    Serial2.print('1'); // Send '1' to Arduino to turn the pump ON

  } else {

    Serial2.print('0'); // Send '0' to Arduino to turn the pump OFF

  }

  // --- Pump LED Widget & Notifications ---

  Blynk.virtualWrite(PUMP\_LED\_VPIN, pumpShouldBeOn ? 255 : 0);

  if (pumpShouldBeOn != pumpOn) {

    pumpOn = pumpShouldBeOn;

    if (pumpOn) {

      Blynk.logEvent("pump\_on", "Water Pump is ON.");

    } else {

      Blynk.logEvent("pump\_off", "Water Pump is OFF.");

    }

  }

  // --- Soil Moisture Notification ---

  if (soilPercent < 30 && !isSoilDry) {

    Blynk.logEvent("dry\_soil", "Soil is too dry! Pump may turn on.");

    isSoilDry = true;

  } else if (soilPercent >= 30 && isSoilDry) {

    Blynk.logEvent("wet\_soil", "Soil is wet again.");

    isSoilDry = false;

  }

}

void setup() {

  Serial.begin(115200);

  // Initialize Serial2 for communication with the Arduino.

  // We specify the RX pin (16, unused) and the new TX pin (25).

  Serial2.begin(9600, SERIAL\_8N1, 16, 25);

  Blynk.begin(BLYNK\_AUTH\_TOKEN, ssid, pass);

  dht.begin();

  timer.setInterval(3000L, sendDataAndControlPump);

}

void loop() {

  Blynk.run();

  timer.run();

}